WHAT IS CLAIMED IS:

1. A method of producing an optical waveguide comprising steps of:

preparing an optical member for use in optical transmission and emitting leakage light to its surroundings; and

curing a photo-curable resin having a lower refractive index after curing than a refractive index of an outer circumference of said optical member by using said leakage light to thereby deposit the cured photo-curable resin on a surface of said optical member.

2. A method of producing an optical waveguide according to claim 1, wherein:

said cured photo-curable resin is formed by curing a mixture solution of a first photo-curable resin of a low refractive index and a second photo-curable resin of a high refractive index different in curing mechanism;

said leakage light is capable of curing said first photo-curable resin but incapable of curing said second photo-curable resin;

said method comprises the step of curing both said first photo-curable resin and said second photo-curable resin after curing said first photo-curable resin by using said leakage light; and

the refractive index of at least one portion of said cured photo-curable resin decreases monotonously as the position of said cured photo-curable resin goes farther from said surface of said optical member.

3. A method of producing an optical waveguide having an optical path portion of a high refractive index and a portion of a low refractive index on a surface of the optical path portion by using a mixture solution of a first photo-curable resin of a low refractive index and a second photo-curable resin of a high refractive index different in curing mechanism, comprising:

a first photo-curing step of curing said first photo-curable resin by first light irradiation capable of curing said first photo-curable resin but incapable of curing said second photo-curable resin while enclosing said second photo-curable resin in said cured first photo-curable resin to thereby form an optical path portion transparent optically;

a second photo-curing step of curing said first photo-curable resin by second light irradiation capable of curing said first photo-curable resin but incapable of curing said second photo-curable resin in the same manner as said first light irradiation to thereby deposit said cured first photo-curable resin on said surface of said optical path portion after the formation of said optical path portion; and

a third photo-curing step of curing said second photo-curable resin enclosed in said optical path portion and uncured residual part of said mixture solution entirely by third light irradiation capable of curing both said first photo-curable resin and said second photo-curable resin.

4. A method of producing an optical waveguide according to claim 3, wherein said first light irradiation and said second light irradiation are performed simultaneously so that said first photo-curable resin is cured on a side of said optical path portion while said optical path portion is formed.

5. A method of producing an optical waveguide according to claim 3, wherein said first light irradiation is applied by an optical fiber.

6. A method of producing an optical waveguide having an optical path portion of a high refractive index and a portion of a low refractive index on a surface of the optical path portion by using a mixture solution of a first photo-curable resin of a low refractive index and a second photo-curable resin of a high refractive index different in curing mechanism, comprising:

a first photo-curing step of curing said first photo-curable resin by first light irradiation capable of curing

said first photo-curable resin but incapable of curing said second photo-curable resin while enclosing said second photo-curable resin in said cured first photo-curable resin to thereby form an optical path portion transparent optically;

a second photo-curing step of curing said first photo-curable resin by second light irradiation capable of curing said first photo-curable resin but incapable of curing said second photo-curable resin in the same manner as said first light irradiation to thereby deposit said cured first photo-curable resin on said surface of said optical path portion after the formation of said optical path portion; and

a step of extracting said portion on said surface of said optical path portion and said optical path portion made of said cured first photo-curable resin with said second photo-curable resin enclosed therein from said mixture solution; and

a third photo-curing step of curing said second photo-curable resin enclosed in said optical path portion and uncured residual part of said first photo-curable resin by third light irradiation capable of curing both said first photo-curable resin and said second photo-curable resin.

7. A method of producing an optical waveguide according to claim 6, wherein said first light irradiation and said second light irradiation are performed simultaneously so that said first photo-curable resin is cured on a side of said

optical path portion while said optical path portion is formed.

8. A method of producing an optical waveguide according to claim 6, wherein said first light irradiation is applied by an optical fiber.

9. A material composition for producing an optical waveguide, comprising:

a radical polymerizable material;

a cationic polymerizable material;

a radical polymerization initiator for initiating polymerization of said radical polymerizable material by light irradiation; and

a cationic polymerization initiator for initiating polymerization of said cationic polymerizable material by light irradiation;

wherein light irradiation at a specific wavelength is effective in activating said radical polymerization initiator but ineffective in activating said cationic polymerization initiator, and

a refractive index of said cured radical polymerizable material is lower than a refractive index of said cured cationic polymerizable material.

10. A material composition for producing an optical

waveguide according to claim 9, wherein a refractive index of the cured composition as a whole is higher by at least 0.001 than the refractive index of said cured radical polymerizable material.

11. A material composition for producing an optical waveguide according to claim 9, wherein said material composition for producing an optical waveguide is provided as a liquid having a viscosity of not higher than 0.1 MPa·s at 25°C.

12. A material composition for producing an optical waveguide according to claim 9, further comprising a thermal polymerization initiator for initiating polymerization of said radical polymerizable material by heating.

13. A method of producing an optical waveguide having an optical path portion of a high refractive index and a portion of a low refractive index on a surface of the optical path portion by using an optical waveguide-producing material composition according to claim 9, comprising:

a first photo-curing step of curing said radical polymerizable material by first light irradiation at said specific wavelength capable of activating said radial polymerization initiator while enclosing at least said cationic

polymerizable material and said cationic polymerization initiator in said cured radical polymerizable material to thereby form an optical path portion transparent optically;

a second photo-curing step of curing said radical polymerizable material on the surface of said optical path portion by continuing said first light irradiation after the formation of said optical path portion; and

a third photo-curing step of curing said cationic polymerizable material enclosed in said optical path portion and uncured residual part of said composition entirely by second light irradiation capable of activating both said radial polymerization initiator and said cationic polymerization initiator.

14. A method of producing an optical waveguide according to claim 13, wherein a refractive index of the cured composition as a whole is higher by at least 0.001 than the refractive index of said cured radical polymerizable material.

15. A method of producing an optical waveguide according to claim 13, wherein said material composition for producing an optical waveguide is provided as a liquid having a viscosity of not higher than 0.1 MPa·s at 25°C.

16. A method of producing an optical waveguide

according to claim 13, wherein said material composition for producing an optical waveguide further comprises a thermal polymerization initiator for initiating polymerization of said radical polymerizable material by heating.

17. A method of producing an optical waveguide having an optical path portion of a high refractive index and a portion of a low refractive index on a surface of the optical path portion by using an optical waveguide-producing material composition according to claim 9, comprising:

a first photo-curing step of curing said radical polymerizable material by first light irradiation at said specific wavelength capable of activating said radial polymerization initiator while enclosing at least said cationic polymerizable material and said cationic polymerization initiator in said cured radical polymerizable material to thereby form an optical path portion transparent optically;

a second photo-curing step of curing said radical polymerizable material on the surface of said optical path portion by continuing said first light irradiation after the formation of said optical path portion; and

a step of extracting cured part immersed in uncured part from uncured residual part of said composition; and

a third photo-curing step of curing said uncured part immersed in said cured part by second light irradiation capable

of activating both said radial polymerization initiator and said cationic polymerization initiator.

18. A method of producing an optical waveguide according to claim 17, wherein a refractive index of the cured composition as a whole is higher by at least 0.001 than the refractive index of said cured radical polymerizable material.

19. A method of producing an optical waveguide according to claim 17, wherein said material composition for producing an optical waveguide is provided as a liquid having a viscosity of not higher than 0.1 MPa·s at 25°C.

20. A method of producing an optical waveguide according to claim 17, wherein said material composition for producing an optical waveguide further comprises a thermal polymerization initiator for initiating polymerization of said radical polymerizable material by heating.